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Back to the Basics: Managing Valuable Product Knowledge and Data

For many engineering organizations, simply managing and controlling access to product design data can present a formidable challenge. Indeed, according to Aberdeen's September 2008 benchmark report, *Getting the Process Right – A Fresh Look at PLM and Product Development*, the average engineering organization lags well behind top performers in this category. Specifically, Industry Average organizations are nearly half as likely as the Best-in-Class to report having a centralized process in place to manage product data and information. This is somewhat surprising, considering the maturity of Product Data Management (PDM). What it suggests, however, is that for many manufacturers, even the most fundamental aspect of product data management- the ability to effectively capture, store, and reuse data - remains an elusive goal.

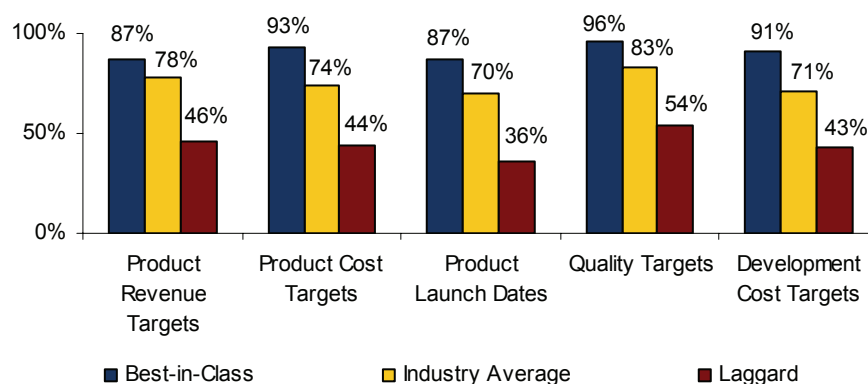
Research Brief

Aberdeen's Research Briefs provide a detailed exploration of a key finding from a primary research study, including key performance indicators, Best-in-Class insight, and vendor insight.

The Maturity Class Framework

Examining how the Best-in-Class manage their product development processes - and the tools that they use to do so - provides some insight into how such knowledge capture and reuse is effectively accomplished by leading manufacturers. As part of a research effort to explore this subject, Aberdeen surveyed over 160 enterprises between August and September 2008. Participating companies were benchmarked according to five key performance criteria. Using these metrics, Aberdeen categorized respondents into the top 20% (Best-in-Class), the middle 50% (Industry Average) and the bottom 30% (Laggard) of performers. Figure 1 displays the performance gaps that define each category.

Figure 1: The Maturity Class Framework



Source: Aberdeen Group, September 2008

What is perhaps most worth noting here is that the Best-in-Class meet direct product cost and development cost targets more than twice as often as Laggard organizations. More over, these leaders develop products that meet product launch dates 2.3 times as often as those of their competitors, ultimately positioning them for greater success in the marketplace.

Having identified these top performers, the next question becomes - what capabilities have they put in place to achieve such levels of excellence? In particular, what lessons can they provide to others seeking to attain similar levels of performance, especially with respect to managing and capitalizing on product information?

The Four Pillars of an Effective Product Information Management Process

Not surprisingly, with respect to the processes underlying effective product information management - the Best-in-Class have achieved a higher level of competency than their peers in a number of key areas, including: design release, program and project management, change and configuration management, and knowledge capture and reuse (Table I).

Table I: Product Information Management

	Best-in-Class	Industry Average	Laggards
Design release - Have an effective process in place to document, approve, and release final designs from engineering to manufacturing	83%	78%	46%
Program / project management - Have a process in place to effectively track and monitor engineering project status - milestones, missed deadlines, etc.	84%	64%	41%
Knowledge capture and reuse - Have a centralized process in place to effectively support the capture and reuse of product data and information	72%	38%	24%
Change and configuration management - Have a process in place to effectively manage changes to the product design and configuration in a controlled fashion	70%	66%	38%

Source: Aberdeen Group, September 2008

What this research suggests is that having an effective process in place to document, approve and release final design to manufacturing, along with the ability to manage engineering and design changes in a controlled fashion - are key components of a successful product development effort. Leading manufacturers, for example, are more than 80% likely than Laggards to excel in these areas.

Effective project management also plays an important role in maintaining accurate information about a product throughout its development. Top performers, in particular, are approximately 30% more likely than their Industry Average peers to have a process in place to effectively track and monitor engineering project status - milestones, missed deadlines, etc.

Capitalizing on PLM / PDM to Manage Product Knowledge and Drive Innovation

What is clearly evident as well, however, is that knowledge capture and reuse truly sets leaders apart from their competitors and represents a key differentiator for the Best-in-Class. At the most fundamental level, the Best-in-Class are nearly 90% more likely (72% vs. 38%) than their Industry Average peers to have a centralized process in place to effectively support the capture and reuse of product data and information - a capability which has been enabled and enhanced through various PDM/PLM technologies and methodologies.

Specifically, the underlying product development management (PDM) or product lifecycle management (PLM) technology currently being employed by the Best-in-Class to achieve their product development goals and objectives, puts these top performers ahead of their peers across nearly every aspect of product information management -- from their use of PDM/PLM to manage engineering bills of material (eBOMs) and CAD models and drawings, to the management of approved manufacturers, vendors or parts lists (AML, AVL, APL) and manufacturing process plans, including the manufacturing bill of material (Table 2).

"We have integrated our CAD and visualization applications to PLM thus far. The main benefits we've achieved are a decrease in design cycle, higher quality designs out-of-the gate (improved manufacturability of new designs and design changes), reduced prototype runs and costs due to improved manufacturability, as well as a decrease in the number of design changes post release."

~ Mark Halbish
Global PLM Director
TI Automotive

Table 2: Competitive Framework: Best-in-Class PDM/PLM-based Capabilities

Product Information / Data	Best-in-Class	Industry Average	Laggards
CAD models, drawings, diagrams, schematics, specifications, etc.	89%	78%	60%
Engineering bill of materials, product structures and configurations	100%	64%	44%
Process goods formulas /recipes and specifications, packaging and labeling data and information	78%	60%	24%
Product documentation like owners, service and other manuals	78%	59%	42%
Manufacturing process plans including the manufacturing bill of materials	83%	64%	42%
Manufacturing preparation deliverables (NC programs, work instructions)	67%	55%	20%
Intellectual Property (i.e. patents, product and process IP, etc.)	65%	43%	23%
Part classification	72%	54%	36%
Bill of Materials or part costing	95%	71%	36%
Management of Approved Manufacturers, Vendors or Part Lists	89%	61%	20%

Source: Aberdeen Group, September 2008

In particular, Best-in-Class organizations are over 1.5 times more likely than their Industry Average peers to use PLM/PDM to manage engineering bill of materials (eBOMs), product structures and configurations and nearly 1.3 times more likely than their peers to use PLM/PDM to track and manage the manufacturing bill of material (mBOM).

Best-in-Class manufacturers are also nearly 50% more likely than their Industry Average peers to take advantage of their PLM/PDM systems to

manage and maintain approved manufacturers, vendors, or parts lists or to perform Bill of Materials/part costing. This is significant in that it demonstrates that the need to manage product-related information continues to expand beyond the realm of engineering and design to include such areas as manufacturing, R&D, marketing & sales, and even finance.

Even process industries stand to benefit from the information management capabilities of PLM/PDM systems to manage process goods formulas/recipes and specifications, packaging and labeling data and information. In this area, Best-in-Class organizations are 1.3 times more likely than their Industry Average peers to have such a system in place.

Best-in-Class organizations also take advantage of their PLM/PDM systems to manage product-related intellectual property, on average 50% more often than their Industry Average peers (65% vs. 43%), positioning themselves well for not only the capture and reuse of valuable product knowledge, but in potentially capitalizing on such IP as part of an open innovation initiative. Indeed, the ability to successfully employ PLM/PDM tools and methodologies to manage and protect valuable product intellectual property and the ability to more easily access existing product knowledge, part models, and related data and to streamline the product development process by integrating more closely with manufacturing - all point to the ability of top performers to manage the most important resource within any organization - its knowledge and "know-how."

Here, we expect to see a continued migration towards the adoption of tools and technologies that will enable organizations not to simply capture the "know-how" of its scientists and engineers - but to know how to tap into, capture and manage the knowledge of others - even those outside the walls of its organization. In this sense, the paradigm has shifted to one that relies more heavily on the ability to locate and capitalize on information - rather than to own it and manage it.

Even with this shift, however, we still see a great need - and perhaps an even greater need - to have an effective process in place for managing product knowledge and information. The fact is, even in its most advanced form - this effort still begins with "Getting the Process Right." And that starts with the fundamentals - having a centralized process in place to do so - and a PLM/PDM system to support this process.

In short, the knowledge capture and reuse capabilities of the Best-in-Class begin with being able to manage the basics - the capture and reuse of engineering and design data related to current projects; the ability to provide some form of version control and control over who has access to this data; and some level of integration with cost data and the ability to manage approved manufacturers, vendors, or parts lists. But it doesn't stop there. Links both upstream to procurement, and downstream to manufacturing are next steps along the path.

"One of the best pieces of advice I got about PDM was, "Implementing a PDM system without changing your processes will only help you make the same mistakes faster. Clean up and redefine your processes BEFORE implementation. The PDM system is not a silver bullet."

~ Engineering Manager
Automotive Supplier

Key Insights

In summary, to achieve Best-in-Class status, manufacturers should consider taking the following steps to improve their product information management capabilities, and ultimately, their ability to capture and reuse valuable product knowledge:

- At the most fundamental level, manufacturers should have a centralized process in place to manage product data and information. Having such a system in place facilitates knowledge capture and reuse and enables organizations to both control access to and benefit from the most up-to-date product information
- Employ PLM/PDM systems to manage such information as the engineering bill of material (eBOM) and CAD models, drawings, and related data as well as manufacturing process plans, including the manufacturing bill of material (mBOM). In doing so, manufacturers are able to more easily track and reference critical product engineering and design data and information, and to more easily update this information, as necessary
- Manufacturers should also consider taking advantage of a PLM/PDM system to manage approved vendors, manufacturers, and parts lists and to perform BOM/parts costing. This can significantly impact their ability to meet direct product cost and product development cost targets

For more information on this or other research topics, please visit www.aberdeen.com.

Related Research

[*Getting the Process Right – A Fresh Look at PLM and Product Development*](#):
September, 2008

[*Profiting from PLM: Strategy and Delivery of the PLM Program*](#): July, 2007

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